

Towards a collaborative platform for architectural co-projecting

Almudena Ribot¹

¹ Polytechnic University of Madrid, c/ Eduardo vela 8, 28023 Madrid, almudena@nuniezribot.com

PAPER ABSTRACT

This essay proposes to recall Habraken's ideas and the Open Building movement about collaboration in architecture and implement them with technology. Incorporating current technology opens up new ways of organizing collaboration in our discipline. This goal represents one of the most interesting challenges currently facing architecture. The paper analyzes how to include third parties in architectural processes, without losing architectural consistency. Stands that participatory architecture is enhanced through assembling rather than composing. This discrimination can be explored especially during the design process and today we have better available ITC tools to organize its complexities.

To achieve this, the following circumstances will be studied: the role of architects, architectural tasks and user's attitude have changed, so the project's focus must do. Seeking for that way of approaching to design we propose four tasks: coordinate incorporations, identify detachable parts, give rhythm to communication and repackage consistently.

We study this research under two focuses: the pedagogical and practical field. From an academic point of view, the essay also explores the development of these capabilities. We have proposed a number of undergraduate architectural design studios in which students experiment in this same way: fragmenting, separating and later assembling. In addition, this field of interest has been deployed in postgraduate academic environments, exploring theoretical participation schemes from different perspectives: collaborative design, architectural design and social implementation.

From the practical point of view the ultimate goal of this research is to develop the design of a Collaborative Digital Platform (Build It Together, BIT). This platform aims to include all actors involved in the design process, changing the current value chain in building construction, and succeeding to modify the architecture of the future.

KEYWORDS: Designing / Customizing / Learning / Digital Platform / ITC / Industrializing / Assembling

AUTHOR BIOGRAPHY: Almudena Ribot is Professor of Design at the School of Architecture ETSAM, Polytechnic University of Madrid (UPM)

Her interests are Industrialization, Customization and Social Sustainability, all concerning complexity dynamic processes including collaboration, flexibility and reversibility.

Recently has built the application of European Union-financed Research Call (H2020), named The BIT Project (Build It Together), which target in develop a Technology and Collaborative Platform for Personalized Home.

In this vein, in her Architecture Office (Núñez & Ribot Arch) they have developed CUATRO50 an Industrialized Housing System Project.

TOWARDS A COLLABORATIVE PLATFORM FOR ARCHITECTURAL CO-PROJECTING

Now it is an appropriate moment to recall is Habraken's ideas of collaboration and the Open Building movement. Two key reasons support this actually.

Firstly the technological aspects. Internet adds easier communications and better social networks management. Today we have powerful digital tools which facilitate drawing prototyping and design (Building Information Modeling BIM, Computerized Numerical Control CNC and others). On the other hand industrialization development helps systematizing in building processes. All of these questions are very important aspects for architects: draw, design, build and communicate. These are the most hen facts for which this debate is back on the air. The paradigm has changed. Incorporating current technology opens up new ways of organizing collaboration in our discipline.

Second reason comes from our professional focus and our relationship with society. We live a moment when the way of access to consumer's goods is new. Therefore the architectural exercise, as every activity relating people, must set in doubt and surely needs to be rethought in order to recover its interest for the society. "Every institution that works in mediation is renewing its legitimacy and every mediation that does not add value is banned to disappear" (1). Searching ideas to adapt architecture to modern society is an urgent task.

One of the most interesting challenge for contemporary architecture lies upon this new situation. Architects face the task of including a wider spectrum of players and of maintaining the complexity of the architectural design process. However, they have to do it safeguarding its key role in the chain of architectural production. All this done where the architect's visibility is being reduced. Our minor prominence does not mean less intervention, it doesn't mean bad news necessarily, but we as architects must be vigilant. If not us, others will do it, and besides of keeping for us the most banal and peripheral work we'll be unwittingly collaborating in infantilizing the architecture.

The Design Process is the situation where adaptations to this new environment should be introduced. The architectural project is the *battlefield* and needs to transform the role from individualistic to being inclusive. Universities should develop new learning systems to respond to this new situation. Students must learn to design in an assembling way. The higher degree of **autonomy** they give to architectural elements the greater chances of collective participation are set. In other words, it is from discrimination and assembling processes rather than fussing and composing where we can meet this challenge.

Current circumstances confirm this approach.

The role of architects has changed.

The architect's image as male, white and individualistic, seen as the central axis around which architecture pivots is clearly overcome. Increasing architectural groups, organized in various ways, no longer match the well-known pattern. Architectural offices are heterogeneous, multidisciplinary and networked nowadays.

We have evolved from ancient architect (in capital letters) to the role of architecture as a social agent. Some theories place today's architects as managers, as planners, other as curators. Anyway, we all agree that the architect is no longer the visionary former dictator in the building process so it needs to be newly redrawn. We are nowadays placed in a new environment that favours new players' incorporation.

Architectural environment has been altered.

The increasing complexity in architecture is a reality. The architects of other centuries controlled all levels of architecture and now this integration is an obsolete issue which, as Habraken warned, should be reviewed, "The long term trend towards greater technical complexity and larger size of buildings continues. Buildings are increasingly intricate multilevel environmental entities." (2)

In large part due to its complexity our working environment has changed. Today we know that making architecture responds to a broad set of issues. In very few cases it's given the traditional linear path, the one that began 1st project commission, 2nd sketching up, 3rd technical drawings, 4th scale model, 5th building scale 1/1, and 6th photographs as final documentation. These processes have been dislocated and now we work fragmentarily, in some isolated parts of the whole or designing something buildable, but not necessarily following that path.

This fragmentation of our work is no longer experienced as a *problem* but it's our new cultural ecosystem. Current processes are no longer linear. This happens in almost all areas of architectural project, from the

design process to the construction ones. Both advance inexorably towards simultaneity. A new playground, of fragmentation and simultaneity, enhancing more actor's collaboration.

User's attitude is a new one.

It is also indisputable that user's demands evolve in their architecture's value chain role, moving from being a passive receiver to co-producer of their space. The famous acronym *prosumer* (union of the English words *consumer* + *producer*) explains very well how blurred has the boundaries become and how we all expect being involved in the production of our consumer goods. It is not just a question of design, meaning personalization or identification with the final product, but that we all as users have a clear interest in economic and management control of the objects we want to acquire. Citizens want to play as architecture users with a major control and less intermediates, as they are doing in many other subjects.

Consequently our ways of designing must change.

In this context, it seems logical that current architectural design does not have the same role in society as in the immediate past. Project as a single vision must evolve into project as an organizing tool. A device no longer unidirectional and incontestable, but a multidirectional issue. This is just one step away of the collaborative and interactive project we are looking for. If it aims towards a more participatory approach the project will have to spend more time open to alternatives and solutions. If we accept that form is the physical structure of the environment, we must accept that playing options depend on it. The longer we keep form receptive, the broadest the play options will be. (3)

In this project's approach we distinguish two major groups. On one hand, designs proposing minimal intervention to allow maximum freedom to the users. Architectures that are delivered unfinished or pose building only that which is considered fundamental, leaving the rest of the elements unfinished. On the other hand, those projects which propose a more finished architecture, by means of incorporating end-users from the beginning. Our interests are in between, in a third way. Not only focused in enhancing user's participation in the project from the start, which may also produce fully conventional architecture. In the end we want to take advantage of the incorporation of others and together with the potential of *Open Building* culture being able to develop a more reconfigurable architecture that may change with the time. A proposal in where collective know how, communication and industrialization technology play a key role.

We were studying this research in two areas, both the pedagogical and practical field.

From an educational point of view, we try to free ourselves of the standard routine that still prevails at universities, placing high emphasis on teaching design the same way the masters of modernism did. Those architects who controlled all levels of the building, from architecture plans, to interior design and decoration.

From a practical level, we would like to design a Collaborative Digital Platform, we call *BIT (Build It Together)*, which aims to include every potential actor involved in the project and allow any citizen to actively participate in their homes design and so in the building where it is located. This tool should link the information and knowledge of architects and industry to the needs and wishes of the non-expert users.

Designing In both cases incorporating the opinion of many others and keeping enough intensity to broaden the limits of the architecture at the same time requires the **development of, at least, four skills**: coordinating incorporations, identifying detachable parts, giving rhythm to communication and re-packaging consistently.

1.Coordinate incorporations / Accepting entries in different categories.

That means to accept, digest and coordinate the simultaneous and the difference. To achieve this objective, first means **to lose the architects absolute role**. As shown in Nicolas Bourriaud, analyzing current visual arts, it is all about having the "will to inscribe the work of art within a network of signs and meanings, instead of considering it as an independent or original form, no longer trying to begin from *tabula rasa* or creating from virgin material, but finding a way to insert it in the countless streams of production "(4). Moreover, we must practice the ability to develop external conceptions: **harvesting other's ideas**.

From the university we approach this issue proposing students to coordinate inputs developed by anyone, to be multisource. For that we give them some spatial and constructive references, lists of case studies or legacies of past students or recycling already processed jobs. These references that must be joined into the project. Things that reminds them they are not alone, that they are designing within an existing network of

people and opinions. We sum our proposal each course but following a cumulative process aiming to improve the previous results not starting from zero. For example we 've been working in the same abstract grid for several semesters and students have to inherit former conditions from previous students. Appropriating these supports from the beginning (FIG 1)

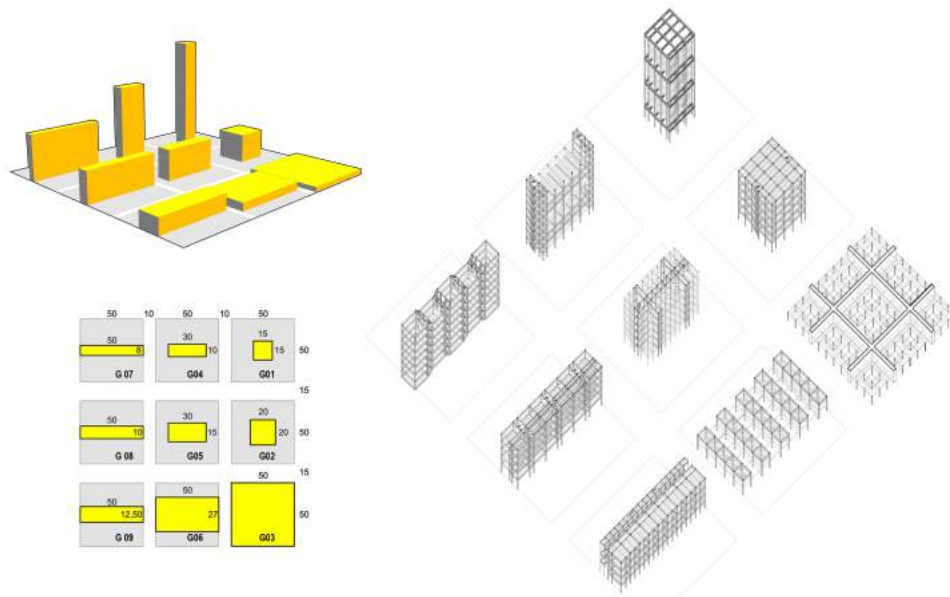


Fig. 1. Open Building Matrix Undergraduate Course 2013. First Supports (Authors: Professors & Students Team)

In developing the Platform BIT we propose multiple entries with different interfaces and languages. We have designed three interfaces: user's interface, supplier's interface and open innovation/designer's interface. All of them with different languages (levels of expertise) integrating heterogeneous categories. Linking the needs among experts and also proposals between experts and non-experts. (FIG 2).

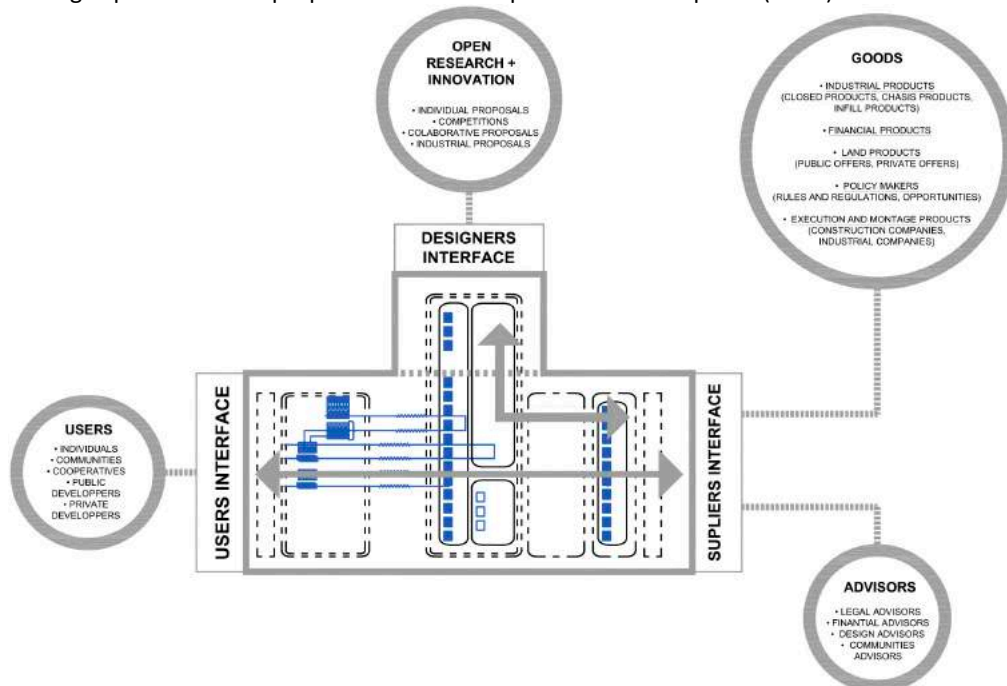


Fig. 2. Diagram, Technological and Collaborative Platform for Personalized Living, BIT. Author: Almudena Ribot 2014.

2. Identify Detachable parts / Untangling the fragments, deciding that what is detachable and isolating

problems.

This task will depend on each project. We must identify the actions (tasks) and organize a specific alignment for each game (there will be projects with more economic weight, others with environmental priorities ...). In the words of Habraken "we must anticipate what configurations are controlled and therefore what agents are prioritized". (5)

The more in tune is each alignment (each project) the better. Players will be less and therefore less the couplings, making the combination easier. By the hand of contemporary industrialization, it is much easier to change the process than to simplify each part "the solution was found in the mathematics of joining. The more parts are exponentially generate more joints. The opposite is also true: fewer parts exponentially generate fewer joints.... It is more difficult and takes more time to research and test redesigned parts than it does to redesign the process A very complex problem is made if a series of smaller, less complex ones." (6)

Therefore, we must place each role in each area not putting more than what is needed in each project. "There is no need to force designing and making into straightjackets. Design doesn't need to be controlled entirely from the top down and making doesn't need to proceed sequentially from the bottom up. Problems can be separated into small pieces and solved both individually as a whole." (7)

From educational point of view we propose that students work identifying isolating and dividing issues. Separating processes increases the awareness of the full complexity and helps them to understand the specific moment of the project as exploratory and unfinished, dependent on something else. Hence it is easier to understand constructive separation between support and infill, between industrialized architectural chunks and elements (FIG 3, 4, 5). It is easier to isolate different agent's actions, classmates, technical specialists, non-experts or end-users additions. So far, we've tested these successfully isolating **formats** from where we have to think the project, working only with one format in each design phase (FIG 6, 7, 8). Designing from a unique format helps students to focus, instructs to develop ideas and adds layers of depth into the project.

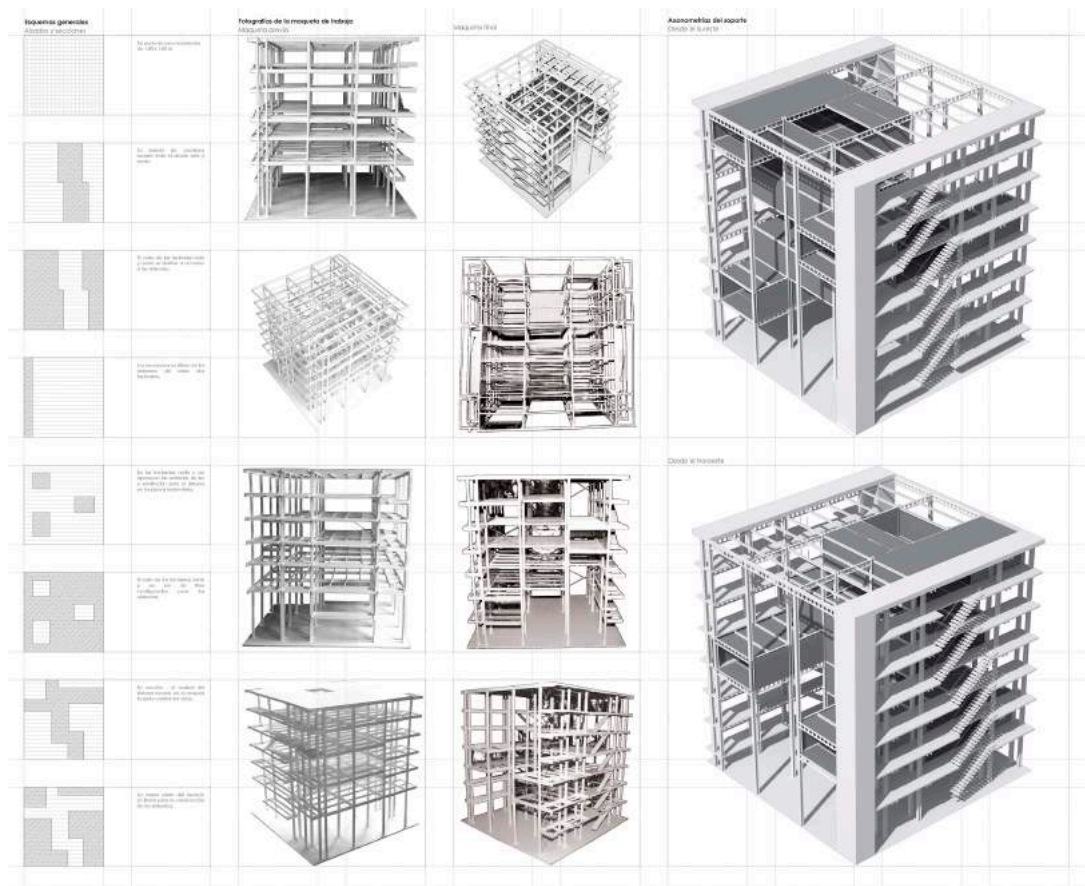


Fig. 3. Support Design. (Student/ Author: Marcos García Mouronte)

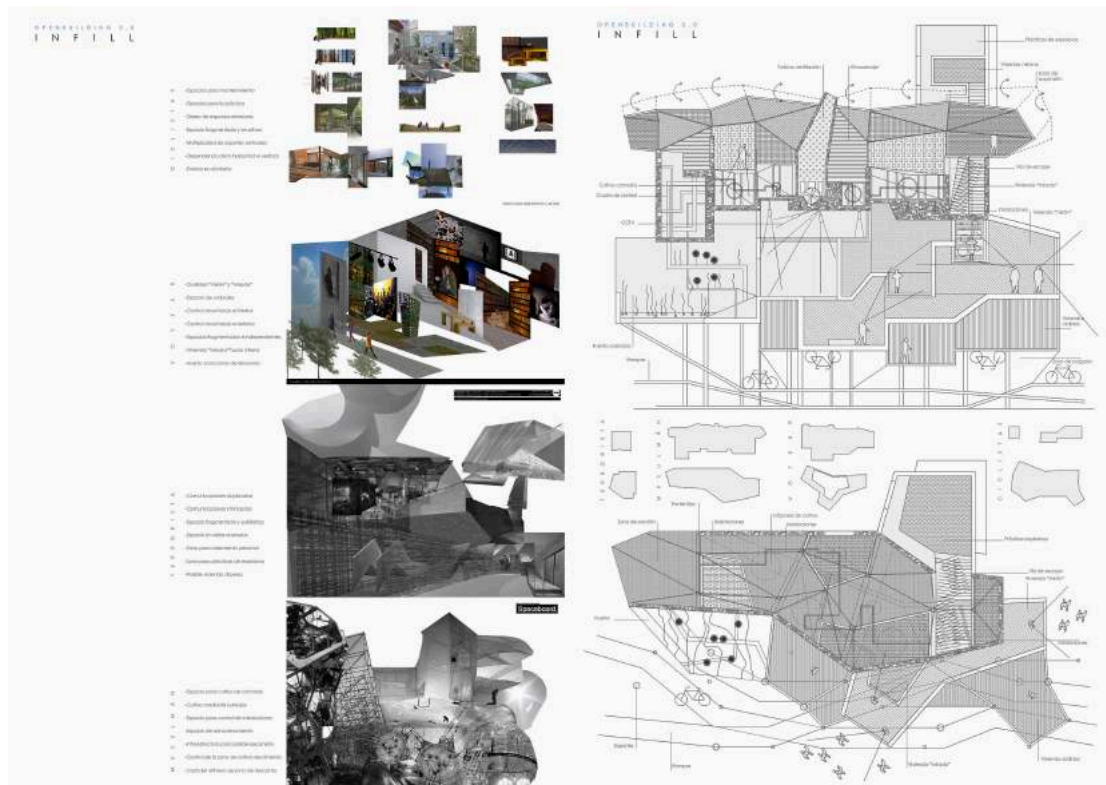


Fig. 4. Infill Design. (Student/Author: Marcos García Mouronte.)

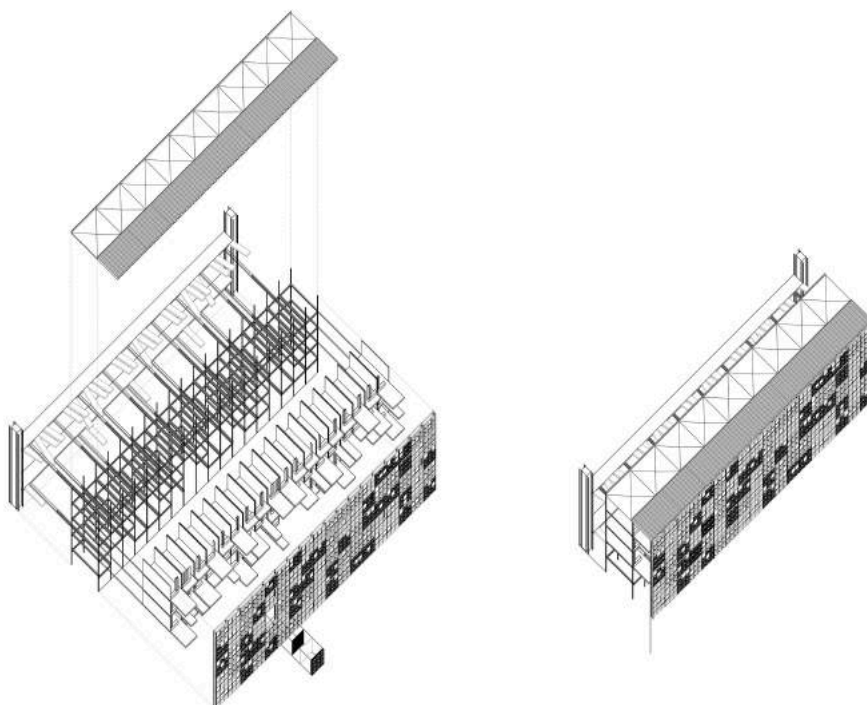


Fig. 5. Constructive separations. (Students / Authors: Azantza Rosillo, Bárbara Jimenez de la Nava, María Muro Murga-Taina).

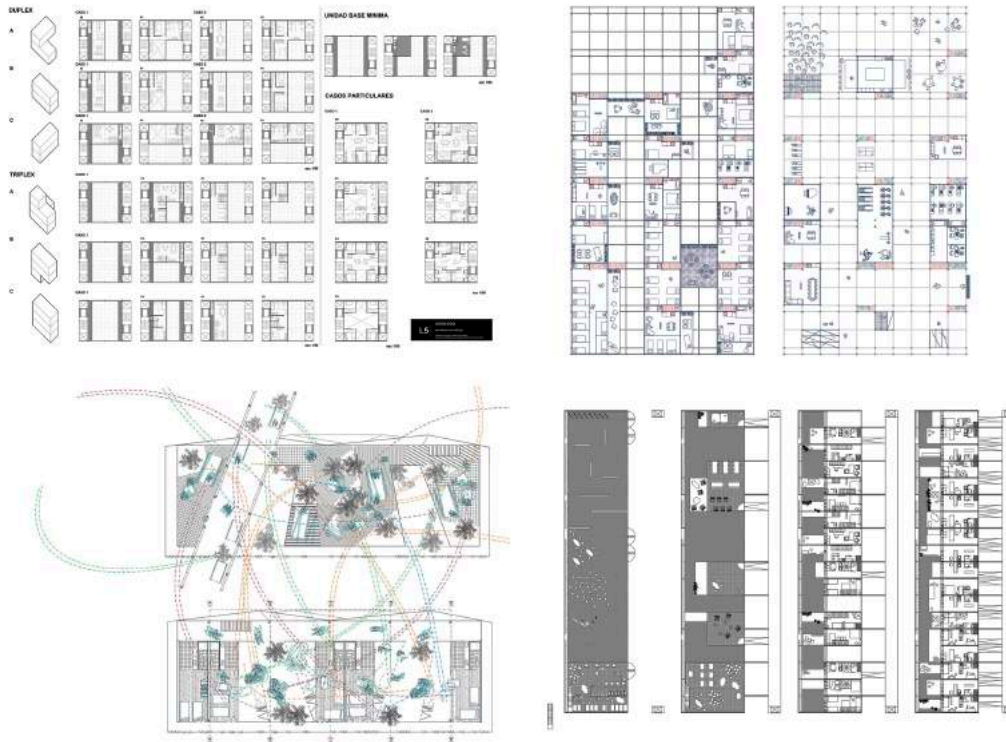


Fig. 6. One Format: Plans. (Students/ Authors: clock wise: Kevin Malca / Delia Sancha Guijarrubia, David Virto Polanco, María Mingot Carrera / Azanza Rosillo, Bárbara Jimenez de la Nava, María Muro Murga-Taína / Enmanuel Álvarez Sanches, Begoña López-Cediel García-Serrano, Álvaro Molina Rollano.)

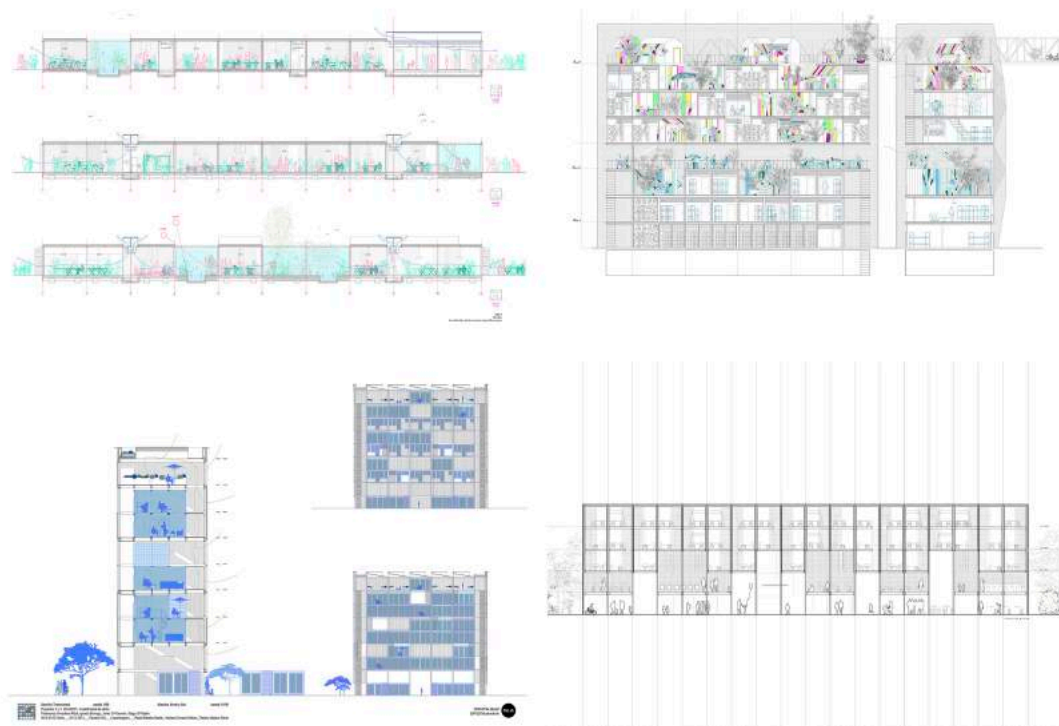


Fig. 7. One Format: Sections. (Students/ Authors: clock wise: Justo Díaz, Luis Lecea, Marta Villa / Enmanuel Álvarez Sanches, Begoña López-Cediel García- Serrano, Álvaro Molina Rollano / Azanza Rosillo, Bárbara Jimenez de la Nava, María Muro Murga-Taína / Tristana Mateos, Mariano Dorado, Paula Ramiro.)



Fig. 8. One Format: Models. (Students/ Authors: clock wise: Mario Capuchino Cano / Kevin Malca Vargas / Ruben Sanz Ocaña / Cristiana Nicoleta, Marco Raul Bernal)

The BIT platform poses a context and different processes for every occasion. The project builds from the already proven split between 'support and infill' and, as it happens with industrial systems, it accepts subdivisions: semi-finished products, chunks and components. There are also several planned agents: users (individuals, organizations or institutions), professional technicians (architects, engineers...) and industrialization companies. In addition BIT incorporates financial products, offers plots and assembling possibilities.

Even with all these forecasts, BIT will always leave room for maneuver. As Simondon though, a certain degree of uncertainty allows to incorporate external information. "... The real development of the machines, of whom it can be said that raises the level of technology, does not correspond to an enhancement of the automated system, but, on the contrary, the fact that the operation of a machine preserve a certain degree of intermediation. This margin is what allows the machine to be responsive to external information. "(8)

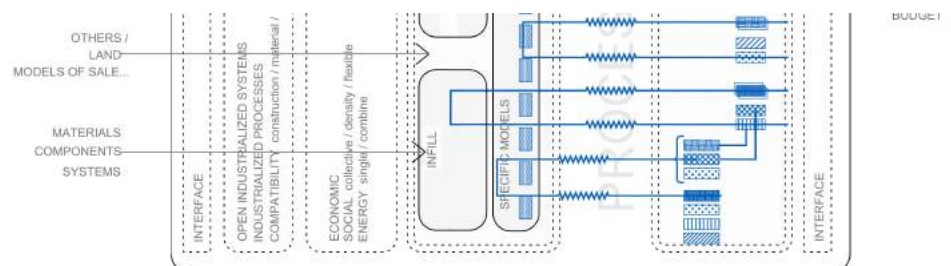


Fig. 9. Basic Diagram, Technological and Collaborative Platform for Personalized Living, BIT. (Author: Almudena Ribot 2014)

3. Give rhythm to communication / Enabling communication between the players and simultaneously measuring the lapse of exchange.

Communication is essential to share anything or in any discipline. However we have to combine it with time enough for self-reflection, because every action requires certain autonomy to develop. Combining both issues, individual concentration and collective communication, is the key to maintain a good creative rhythm.

At the university we work hard with the rhythms of designing. It's not only a point of enhance communication, but also the rhythm between people involved. Some experiences have consisted in designing only from a certain role in each of the project phases (e.g. Climate, constructive or programmatic role). Subsequently, with the incorporation of other students' ideas, we sum up all the contributions and redefine the project. (FIG 10)

We use conventional systems in collective work (students design in teams, collective decisions, investigating in the same basic issue for several years...) searching new entries and alternatives to a common problem. We share all the information generated, because we must build confidence and feel that the *group produces*. In addition to these conventional systems, we found out it is more effective to use the same format of drawing simultaneously. Having every student working in the same graphical language also boosts communication automatically. If we understand each other we can negotiate.

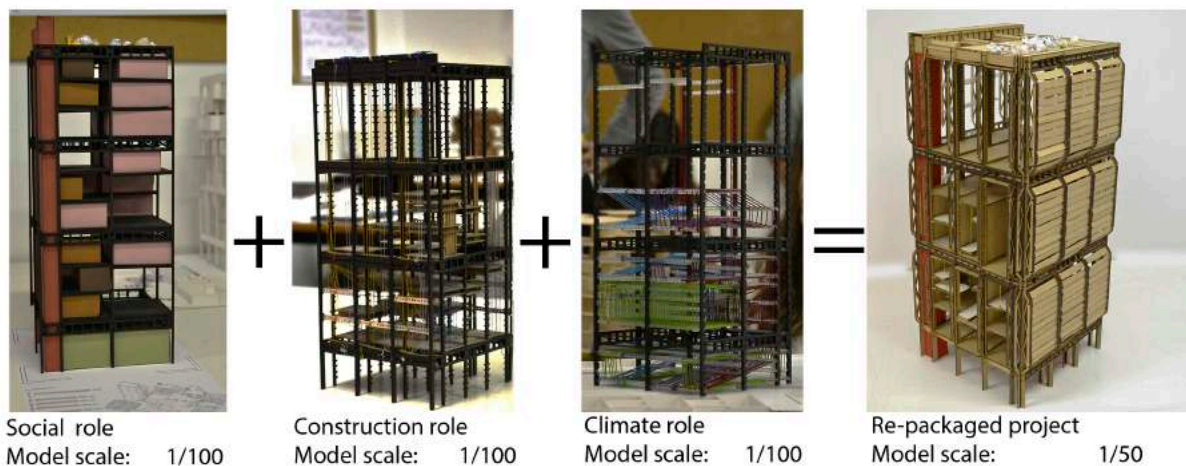


Fig. 10. Separate Roles Designs. (Students/ Authors: Eugenia Picela / Borja Moronta / Carlos Moya = Eugenia Picela + Borja Moronta+ Carlos Moya.)

On the BIT platform we intend to use a more sophisticated system to join ideas. The proposal is to design a system of simultaneous graphic translation that allows fast transfers from one language to another, between experts and experts and non-experts. Interactive programs or games but in asynchronous inputs and outputs and not necessarily in person nor real time.

4. Re -package consistently / Put in relation the parts making the most of collective intelligence using the tools at our disposal.

Re-packaging is also a difficult task in order. To be effective it's more useful to think as assemblers than as composers. Assembler architects uphold that the elements exist and have autonomous reality themselves. These architects seek compatibility between those and search their points of agreement. We could say that their primary action is *to select*. Composer architects think that the elements do not exist by themselves or hardly have any importance, being the architecture what integrates and gives them meaning. Its primary action is *to bind/link*.

Assembler architects juxtapose components and deal with the specific, they produce an architecture with *quasi* autonomous elements, that are easily re-identifiable and removable. Composers may also juxtapose, but they do so in a casting process that neutralizes the individual parts, fuses them and creates an amalgamation.

If we think about this distinction as the George Simondon (the French philosopher of the Technique) did, we

shall say that assemblers are producers and composers are begetters. "In the domain of life the organ is inseparable from the species; in the technical field, the element, precisely because it is manufactured, is detachable from the ensemble in which it was included. There lies the difference between the *begetted* and *produced*." (9)

If we think about the project as a film editor, we shall say that assemblers are more interested in the rupture processes while composers seek more for continuity in the narrative.

May both rely on the magic of *relational architecture*, but the assemblers believe in the magic of the technique while the others, the composers, are totally dedicated to alchemy. When we refer to the magic of technique we focus towards confidence in the technical imagination, which is developed so well by García Lorca (the Spanish poet) or Simondon himself. I collect Lorca's work because his crystalline language. He says:

"The human imagination invented giants in order to attribute to them the construction of great grottoes or enchanted cities. Later, reality taught us that those great caves are made by the drop of water. The pure, patient, eternal drop of water. In this case, as in many others, reality wins. *The drop of water's instinct is more beautiful than the giant's work. Reality wins imagination in poetry. Imagination was logical thinking in giants, but science's reality, extreme poetic and outside the scope of the logical, gives us the truth with the eternal and clear drops of water.* After all, it is much more beautiful that a cave be a mysterious caprice of water – chained and ordered by eternal laws – than the whim of giants who have no other meaning than that of an explanation". (10)

The trend towards this assembly pattern is predictable. Increasingly there will be more elements (individuals, groups, compatible and preconceived components) among which architects will select and connect them. We don't not know how it will really be, but we already know that this will happen and there will be a big database of solutions to choose from. Because all this things, thinking like assemblers is an attitude that will be very helpful for the participatory design process we will need in our immediate future.

1. Innerarity Daniel, interview El País Semanal nº 2035/27.09.2015 pg32.
2. Habraken N.J.. Edit Jonathan Teicher. *The Structure of the Ordinary. Form and Control in the Built Environment* (MIT Press 2000). 74.
3. In agreement with Habraken "to note the considerable extent to which the form actually determines the game played". Op.cit. Habraken. 38.
4. Bourriaud Nicolas *Postproducción. La cultura como escenario: modos en que el arte reprograma el mundo contemporáneo*. (Adriana Hidalgo ed, 2007. Trad Silvio Mattoni).13.
5. Op.cit. Habraken. 16-17. 28.
6. Kieran and Timberlake. *Refabricating Architecture. How manufacturing Methodologies Poised to Transform Building Construction*. (McGraw-Hill EEUU 2004). 97.
7. Op. cit. Kieran and Timberlake.15.
8. Simondon Gilbert *El modo de existencia de los objetos técnicos*. (Prometeo libros, Buenos Aires 2008. Trad. Du mode d'existence des objets techniques.ed. Flammarion, París.) 33.
9. Op. cit. Simondon. 87.
10. García Lorca Federico. "Conferencia en Granada, 11 octubre 1928. Resumen del *El Defensor de Granada*". *Obras Completas*. Tomo III. Prosa-Dibujos. (Aguilar ed. 1954, 1986). 260.
English reference: THE IRRESISTIBLE BEAUTY OF ALL THINGS. From a lecture entitled 'Imagination, Inspiration, Evasion,' by Federico Garcia Lorca, reconstructed and translated by Christopher Maurer from newspaper accounts published between 1928 and 1930. It appeared in issue 7 of *Jubilat* and is included in *Sebastian's Arrows: Letters and Mementos of Salvador Dali and Federico Garcia Lorca, published Autumn 04 by Swan Isle Press*.<http://home.primus.ca/~remedy3/The%20Irresistible%20Beauty%20Of%20All%20Things.htm>.
We have add a free translation of part of the poem (type in italics) because doesn't exist an English translation of this fragment.

BIBLIOGRAFY

Bourriaud Nicolas *Postproducción. La cultura como escenario: modos en que el arte reprograma el mundo contemporáneo*. (Adriana Hidalgo ed, 2007. Trad Silvio Mattoni).

García Lorca Federico. "Conferencia en Granada, 11 octubre 1928. Resumen del *El Defensor de Granada*". *Obras Completas*. Tomo III. Prosa-Dibujos. (Aguilar ed. 1954, 1986).

Habraken N.J.. Edit Jonathan Teicher. *The Structure of the Ordinary. Form and Control in the Built Environment* (MIT Press 2000).

Kieran and Timberlake. *Refabricating Architecture. How manufacturing Methodologies Poised to Transform Building Construction*. (McGraw-Hill EEUU 2004)

Tapscott Don and Williams Anthony D. *Wikinomics. How mass collaboration changes everything*. (Atlantic Books, London 2007)

Simondon Gilbert *El modo de existencia de los objetos técnicos*. (Prometeo libros, Buenos Aires 2008. Trad. *Du mode d'existence des objets techniques*.ed. Flammarion, París.)